



New York State Energy Research and Development Authority

Oakwood Health Care

Engine Heat used for Building HVAC

DG/CHP Program

Project Profile

Combined heat and power for
Senior Care Facility



Quick Facts

Location:

Williamsville, NY (National Grid)

Installation Date:

October 2001

Operating Experience:

4 years (as of October 2005)

CHP Equipment:

Two Waukesha 300 kW Engine-Generators Sets

Generating Capacity:

600 kW

Heat Recovery Application:

HVAC and DHW (> 1,200 MBtu/h peak)

Design CHP Efficiency:

60% HHV (design)

Type of Fuel:

Natural Gas

Annual Utility Savings:

\$55,000 (estimated)

Simple Payback:

18 years (estimated)

Overview

ElderWood Health Care at Oakwood is a senior care center located in Williamson, NY. Oakwood provides independent and assisted living services for up to 200 residents. Maintaining comfortable space conditions is critical to the residents' health and wellbeing.

Two 300 kW engine-generator sets were installed at the site, either is sufficient to power the facility. Heat recovered from the engine jackets and exhaust is used for space conditioning and to augment the supply of domestic hot water (DHW). The CHP system provides all of Oakwood's electricity and can operate at an efficiency of 70% HHV or greater on the coldest winter days.

The Application

Extended care facilities have significant energy demands related to the building HVAC. Oakwood had used boilers and electric chillers to maintain space conditions and chose to install a grid isolated CHP system. The engine-generators can operate independently or together to meet the facility's power needs. A 300 kW diesel generator set provides additional backup. Heat from the engine coolant jackets and exhaust is recovered as hot water that is used to offset existing thermal loads.

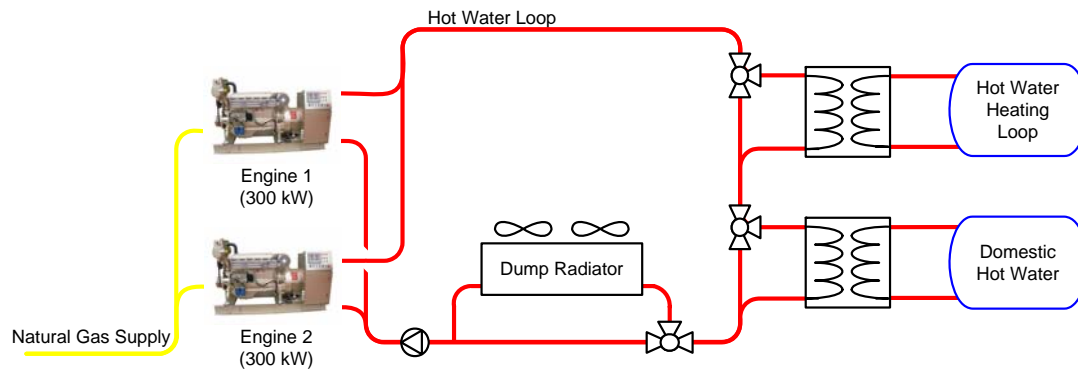
An ice storage system was installed with the CHP equipment. Ice is stockpiled at night during the summer in special storage tanks and then melted through the following day to offset the chiller load. Consequently, the generator capacity could be reduced and power requirements tend to be more seasonally consistent.



Engine-Generator Sets During Installation

CHP System and Equipment

The CHP system is configured on two, 6-cylinder natural gas fired engine-generator sets. Electricity can be produced in parallel with or independent of the utility grid; the generators can continue operating in the event of a blackout. The system's electrical output is generally modulated to follow the site load though electricity can be exported to the grid when the plant runs in paralleled mode. Waste heat from the engine jackets and exhaust is recovered as hot water that is circulated through heat exchangers in the return legs of the DHW and hot water heating systems. Service water is thus preheated before reaching the existing boilers causing fuel consumption to be proportional decreased. Excess heat is rejected to atmosphere through external radiators.



Economics and Environmental Benefits

Daily summary data were collected from the site from December 2001 through December 2003 and are available on NYSERDA's DG/CHP web site. The data indicate the CHP system produced almost 1,700,000 kWh during 2002 while providing a maximum average daily output of 335 kW. The installed cost of the CHP equipment approached \$1,000,000. The ice storage system cost an additional \$80,000. Net savings of \$55,300 were reported for the first year of operation including credit for almost \$200,000 in avoided electricity purchases and \$34,000 in offset fuel costs. Use of the CHP system should reduce nitrogen oxide, sulfur dioxide and carbon dioxide emissions by approximately 1, 3 and 1,000 tons per year, respectively, compared to the conventional mode of operation.



Engine Control Panels



Ice Storage Tanks

Summary of Benefits

- CHP system can operate independent of the utility
- Sufficient capacity to provide all power required
- Ice storage system offsets additional 150 kW of summer peak load

“The ability to produce our own heat and electricity provides an extra safeguard to ensure resident's safety and comfort.”

- David Tosetto,
Director of
Development,
Elderwood

Web Links and Further Information:

Gerster Trane
Energy Services –
Developer/Engineer

www.gerstertrane.com

Engine
Manufacturer

www.waukeshaengine.com

Other
DG/CHP
Resources

chp.nysenda.org

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